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RECORD OF GEOGRAPHICAL PROGRESS.

THE POLAR REGIONS.

DR. NANSEN'S ARCTIC JOURNEY.—The safe return of Dr. Fridtjof Nansen and his entire party from their three years' voyage in the Arctic Ocean, with a record of many interesting discoveries, is an event of uncommon geographical interest and importance. Here are the chronology and main facts of their wanderings:

Period 1. The *Fram's* Voyage along the Coasts of the Old World (July 21 to Sept. 15, 1893).—Starting from Vardö the *Fram* made all haste through the Strait of Yugor and along the Asian coast, but was prevented by a storm from touching at the mouth of the Olenek River, where an additional supply of dogs had been collected. The course was then laid to the northeast in order to enter the ice-pack west of the New Siberian Islands.

Period 2. The *Fram's* Ice Drift to the Northwest, a year and a half, to Dr. Nansen's Departure on his Sledge Journey (Sept. 15, 1893, to March 14, 1895).—The *Fram* entered the ice on Sept. 22, 1893, in $78^{\circ} 50' \text{ N. Lat.}, 133^{\circ} 37' \text{ E. Long.}$, and its position at the end of this period was $83^{\circ} 59' \text{ N. Lat.}, 102^{\circ} 27' \text{ E. Long.}$ At times the drift was interrupted and occasionally reversed, the ice moving southerly, particularly in the summer months. The drift averaged less than a mile a day. The highest point attained was $84^{\circ} 04' \text{ N. Lat.}$ As the mean direction of the drift was carrying the *Fram* towards Spitzbergen rather than towards the Pole, Dr. Nansen decided to leave his ship in command of Capt. Sverdrup, and, with Lieut. Johannsen and dog teams, to advance as far north as possible by sledge.

Period 3. Dr. Nansen's Sledge Journey to his Highest North (March 14 to April 7, 1895).—Dr. Nansen left the *Fram* with Lieut. Johannsen, 28 dogs, 3 sledges and 2 kajaks or skin canoes, and in 17 days reached $86^{\circ} 14' \text{ N. Lat.}$, the highest point he attained. This is $2^{\circ} 50'$, or 170 geographical miles, further north than Lockwood's highest point, reached in May, 1882, in $44^{\circ} 5' \text{ W. Long.}$ When he stopped he was within 261 statute miles of the North Pole (the distance between New York City and the southern part of the White Mountains). The southern ice drift and rough ice greatly impeded his advance. The longitude of the sledge journey has not been indicated, but it is about 90° E.

Period 4. The Journey Southwest to Franz Josef Land (April 8

to Aug. 26, 1895).—Four months and a half of sledging, rendered very difficult by cracks and soft snow, before Dr. Nansen made his second landing on the coast of Franz Josef Land, at the point where he spent the winter in $81^{\circ} 13'$ N. Lat., 56° E. Long.

Period 5. The Winter in Camp (Aug. 26, 1895, to May 19, 1896).—Dr. Nansen and Lieut. Johannsen built, at a place where sea game was easily procured, a stone-walled hut with roof of walrus hide, the whole covered deep under snow. Here they lived ten months on bear and walrus meat, making new clothing from blankets and sleeping bags from bear skins.

Period 6. The Journey South and the Meeting with the Jackson Polar Expedition (May 19 to July 18, 1896).—Hoping to reach Spitzbergen, Dr. Nansen and his comrade set out to the south and southwest, following open water much of the time till they met, off Cape Flora, the Jackson expedition which had spent two years in Franz Josef Land. The two explorers left Franz Josef Land on the Jackson supply steamer *Windward* on Aug. 7, and arrived at Vardö on Aug. 13, 1896.

Period 7. Continued Drift of the *Fram* from the time that Dr. Nansen left her until she reached the open sea (March 14, 1895, to Aug. 13, 1896).—At first the *Fram*, with Captain Sverdrup and nine men, drifted westward, but, in the summer, adverse winds sent the ice back and it was not till October that the favorable drift recommenced. During the winter and especially in January and the first part of February, 1896, the drift towards Spitzbergen was comparatively rapid. On Oct. 16, 1895, the *Fram* reached the highest latitude she observed ($85^{\circ} 57'$ N. Lat., 66° E. Long.) within 17 geographical miles of Nansen's farthest. From this point her drift was mainly southwest towards Spitzbergen. On July 19, 1896, while still 150 miles north of the open sea, Capt. Sverdrup began to force his way through the ice, breaking a channel foot by foot by steam and warping and blasting the ice where it could not otherwise be loosened. On Aug. 13, the day that Dr. Nansen arrived at Vardö, the *Fram* reached open water to the north of Spitzbergen, in $81^{\circ} 32'$ N. Lat., $11^{\circ} 40'$ E. Long. She arrived at Norway on Aug. 20, just a week after the arrival of Nansen.

The scientific results of this remarkable expedition, as far as they have yet been made known, may be thus summarized:

Geography.—Several new islands discovered off the Taimyr peninsula, and a new island in the north part of the Kara Sea; very shallow water off the mouth of the Olenek River; determination of the non-existence of any large body of land in an area of about 50,000

square miles in the western part of the Asian Arctic ocean, supplementing the similar discovery by De Long relative to the eastern part of this ocean; evidence that Sannikof Land, of which only a small segment of the southeast coast was known, is only a small island and thus defining, within narrow limits and in connection with De Long's work, the extent of the new Siberian Archipelago; evidence, in connection with Jackson's work, that Franz Josef Land contains no extensive land mass, but consists of small ice-capped islands, which do not extend much, if any, north of the 82d parallel. This discovery leaves the archipelago or land on the Greenland side, traced along its northwest side by Lockwood and Brainard in 1882, and visited on its southern side by Peary in 1892 and 1895, extending further towards the North Pole than any other land yet discovered.

Geology.—"Found moraines and erratic blocks with striæ under the water. Great disintegration appears to have removed them from above the water. These marks indicate that Siberia has been ice-capped, which is opposed to former doctrine."—PROFESSOR MOHN. These discoveries, however, bear out the observations made by Baron Toll, the Russian, along a part of the Siberian Coast in 1893.

Marine Hydrology.—The unusual Arctic Ocean depths previously recorded to the west and southwest of Spitzbergen are found to extend continuously north of that Archipelago, also north of Franz Josef Land, and between that island group and the New Siberian islands to the north of the 79th parallel. South of that parallel, the depth was only up to 90 fathoms. The deepest sounding was 1,942 fathoms (over two miles). Captain Sverdrup writes: "The depth of the sea during our drift was about the same we had found before Nansen's departure, viz., 1,800 to 1,900 fathoms." The most extensive deep known in Arctic waters is thus revealed, and its close proximity to the North Pole largely decreases the probability that there is any very extensive land mass in that neighborhood. "The temperature of the water is from freezing point to $-1\frac{1}{2}$ degrees (Celsius) at the surface and to a depth of 100 fathoms. Under this layer the water is above the freezing point to $+1\frac{1}{2}$ degree to the bottom."—PROFESSOR MOHN.

Professor Mohn in his condensed summary of results, as given to him by Nansen, says: "The current flowed precisely as assumed by Nansen, strongest to the north and northwest in winter and in a contrary direction in summer." This may be assuming too much. Dr. Nansen's theory as to marine currents in the Arctic

waters he visited appears not to have been disproved by his experience, but neither has it been substantiated by any facts yet announced. The ice drift was with the prevailing winds. In a letter from Lieut. Johannsen (*London Daily News*, Sept. 8), he says: "One cannot affirm that there is any regular Polar current running below the ice. . . . But it is a fact that the Polar winds have a certain constancy; the ruling direction is northwest, and these Polar trade winds, as they might be called, set in motion the immense ice masses from East Siberia towards Greenland." Captain Sverdrup, in his statement of the *Fram's* drift north of Spitzbergen (*London Daily Chronicle*, Aug. 27), says: "During the summer we had winds from the southwest and west which drifted the *Fram* backwards towards the northeast and east."

The ice was hummocky, alternating with comparatively level floes.

Meteorology.—Daily observations were made with the usual instruments by Lieut. Johannsen, and the temperature and atmospheric pressure were also registered by Richards's apparatus. The lowest temperature was -62° Fahr. and the highest $+37\frac{1}{2}^{\circ}$. After Dr. Nansen started on his sledge journey the temperature was about -40° , with little intermission for three weeks. Blessing made many observations of the aurora, which never appeared to hover low. The simultaneous observations of Nansen, the *Fram*, Jackson and Ekroll will probably prove very valuable. The determinations of relative humidity were successful. The instruments did not rust, a proof of the dryness of the cold air.

Magnetic Observations.—Numerous observations were taken with instruments on Neumayer's system.

Biology.—Organic life was found in the pools on the ice. No animal life was found in the most northern regions, or trace of life in the great oceanic depths. Migratory birds were not seen.

Determining Geographical Coördinates.—The astronomical fixing of localities was made at all seasons with Olsen's universal instrument erected on wooden pillars frozen fast in the ice. The instrument was invaluable in the period of twilight. The chronometers were regularly controlled by observations of the eclipse of Jupiter's moons.

Hygiene.—In sanitary as well as in other respects the *Fram* fulfilled all expectations. The quarters were warm, there was no illness, and plentiful electric light was derived from the windmill and accumulators. Dr. Nansen has new views concerning scurvy.

Methods of Polar Travel.—Dr. Nansen is convinced by his experience in Franz Josef Land that Arctic wintering is facilitated by adopting many of the habits of the Eskimos; also, that “dogs, canoes, sledges, and the greatest possible self-provisioning will allow of journeys towards the Pole being undertaken over the Polar ice.”

The *Fram* was exposed to violent ice pressures, but was superior to every strain. Her sloping sides served the purpose intended, and at times she was lifted out of her ice-bed by the intense pressure.

Searching for Dr. Nansen.—While many are rejoicing over the safe return of Dr. Nansen and the *Fram*, the Norwegian trader Hansen, who was sent out on June 1 to look for traces of Dr. Nansen along the northern coast of Siberia, is still in the field. The Russian Geographical Society instructed Mr. Hansen to travel along the coast east of the Yenisei River to ascertain, if possible, where Dr. Nansen pushed into the ice-pack; to visit Cape Chelyuskin, the most northern point of Asia; and to go to the New Siberian islands to learn if the supply depot established there for Dr. Nansen by Baron Toll had been opened.—(*Petermanns Mittheilungen*, 1896, Part VIII.)

THE NEXT ATTEMPT ON THE NORTH POLE.—Mr. Jackson and his party are now spending their third year in Franz Josef Land. The letters that Mr. Jackson sent to England by the *Windward*, in August, indicate that he expected to complete the mapping of Franz Josef Land this fall, and in the spring to push north as far as possible by boat or sledge. “I look upon Queen Victoria Sea,” he wrote, “as my most favourable route northward next year. When the sun returns next spring the mapping of Franz Josef Land will be practically complete, and nothing should prevent my attempting the open water or the crust of ice of this sea.” Mr. Harmsworth, who fitted out and is supporting the Jackson Expedition, says that Mr. Jackson will strain every nerve, next spring, to beat Nansen’s record. The *Windward* took to him last summer an entirely fresh equipment of sledges, reindeer, portable boats, tents, and food sufficient for several years, and his right-hand man, Lieut. Armitage. Dr. Kettlitz and Mr. Hayward remain with him, though they were at liberty, by the terms of their agreement, to return home in August last. By his journeys in 1895–96 Mr. Jackson has shown that the lands seen by Mr. Payer in the Austrian Expedition of 1873–74 were not the coasts of large land masses, as he inferred, but were

comparatively small islands. Payer's Zichy Land and Wilczek Land, in fact, do not exist. Mr. Jackson has found that Franz Josef Land consists of small islands; and where Payer placed great land masses on his map Mr. Jackson has found a large sea which he has named Queen Victoria Sea. He has taken over 1,000 photographs, made large collections and some discoveries in natural history, particularly in botany.

MR. ANDREE RETURNS HOME.—Mr. S. A. Andree found the conditions unfavorable for starting on his Arctic balloon journey from Danes Island, Spitzbergen, last summer, and has returned to Norway. He expects to make another attempt next year.

MR. PEARY'S RETURN FROM GREENLAND.—The steamer *Hope* arrived at Sydney, Cape Breton, on Sept. 26, with the personnel and collections of the last Greenland expedition of R. E. Peary, C.E., U.S.N. This is Mr. Peary's fourth visit to Greenland, and the sixth expedition (1891-96) under his direct command or auxiliary to his work, that has gone to Greenland fully equipped for exploratory or scientific research. During the past season Mr. Peary pushed north nearly to Cape Sabine (78° 50' N. lat.), but was prevented by heavy ice from reaching the cape. Mr. Peary found that last winter was exceptionally severe in Greenland. The east coasts of the American mainland and the islands north of it were blocked by a wide barrier of ice from Turnavik Island, Labrador, to Cape Sabine till late in August. The past summer was marked by much wind and unusually heavy ice, particularly along the west side of Davis Strait and Baffin Bay. On the way north Mr. Peary landed Mr. George Bartlett and his party in the Waigat to collect fossils; Prof. Burton, of Boston, and his party in Umanak Fiord; and Prof. Tarr, of Cornell University, and his party at Wilcox Head, Melville Bay. Before Mr. Peary picked them up on his return these parties were able to devote five or six weeks to geological and glacial studies and natural history collections. Several tons of fossils were gathered. Melville Bay was crossed, in spite of ice and fog, in twenty-six hours, and the *Hope* reached Cape York on Aug. 8, where it was learned that an epidemic of influenza had killed twenty-eight of the Arctic Highlanders, eleven per cent. of their entire number. Anniversary Lodge in Bowdoin Bay, Inglefield Gulf, Mr. Peary's second home in North Greenland, had been burned by the carelessness of a native. The *Hope* touched at various settlements along the coast,

making large ethnological collections. Many specimens of walrus, reindeer, narwhal, white whales, seals, etc., and a series of Arctic birds in all stages of growth were obtained. On the return to Cape York an attempt was made to secure the large meteorite east of that point, but the hoisting machinery was disabled in the difficult work, and before the stone could be hoisted aboard the *Hope* was compelled by the ice to retreat on Sept. 3. The stone has been removed to the water's edge, where it may be secured for the American Museum of Natural History at the next favourable opportunity.

Mr. Peary returned with two live polar bears and a hundred cases of collections for the Museum. In a despatch to the New York *Sun*, Mr. Peary expresses the opinion that the work of Nansen and Jackson has eliminated the Siberian Arctic segment and Franz Josef Land as possible polar routes. There remains the Greenland route as the only land base for further attack on the polar problem. Mr. Peary says the land mass north of Greenland, whose south side he saw in 1892 and 1895, and whose north-west coast was traced by Lockwood in 1882, certainly extends to 84° or 85° , and probably beyond, and this most northerly land known would serve as the point of departure. He adds:

"With an ample supply of provisions a ship might be advanced as far north as Sherard Osborn Fiord. There is as good a chance to force a ship through to that fiord as to Discovery Harbor, where Nares's ship spent the winter of 1875-76. A party composed of two white men and my faithful, hardy, loyal, Eskimo friends from Whale Sound could, by the close of the season in which the ship reached the fiord, have the shores of that archipelago largely determined, and make a supply depot as far north as 85° or 86° from which to start across the ice northward or follow the islands, as the case might be, in the spring. The relief ship need only come to Whale Sound, for the retreat across the ice-cap from the head of Sherard Osborn Fiord with light sledges could be accomplished in two weeks or less."

PEARY LAND.—With the approval and by the desire of geographers in America and Europe, the extreme northern part of Greenland, made known to the world by Mr. Peary's remarkable sledge journey of 1892 on the inland ice, has been named Peary Land. The suggestion was made by the Geographical Club of Philadelphia, and has been seconded by Arctic authorities generally and by *Petermanns Mitteilungen*. His journeys to this region in 1892 and 1896 have hardly been equalled as feats of Arctic sledging. His itineraries covered a distance of about 2,700 miles on the ice-cap at heights of from 3,000 to 8,000 feet above sea level.

NORTH AMERICA.

THE HYDROLOGY OF THE MISSISSIPPI.—James L. Greenleaf, C.E.' in an article on "The Hydrology of the Mississippi" (*American Journal of Science*, July, 1896), says it is fortunate for the dwellers in the Mississippi Valley that the tributary streams differ very widely in their times of flood. If their period of high water occurred simultaneously, the main river would have to carry over 3,000,000 cubic feet of water per second to the Gulf of Mexico. It is rare, however, for more than two large tributaries to reach their highest flood period at the same time. The largest flood from the Ohio, for instance, disappears before that from the Missouri reaches the Mississippi, and through this fortunate circumstance the aggregate in the main river is kept down, so that 1,800,000 cubic feet per second may be regarded as a large flood discharge from the Mississippi. The lower river usually reaches its maximum volume in April or May and its lowest stage in October or November.

BURIED TIMBER IN GLACIAL LAKE BEACHES.—Mr. Ossian Guthrie, who has given much time to researches on the glacial drift of Chicago and the southern shores of Lake Michigan, reports (*The American Geologist*, April and June, 1896) the discovery of three oak logs buried in the beach gravel in that city. One of them, found eleven feet below the surface, was two feet in diameter, and was traced a distance of fifty feet. The second was eight feet below the surface, and fragments of elm, willow, butternut and black walnut were found in the same beach deposit. The third log was found in North Chicago, ten miles from the others, fifteen feet above the present lake, and covered by forty feet of fine clay silt, which protected it so that its wood differs from a modern log chiefly in its blackened color. Its age is estimated at 7,000 years, more or less, equal to the length of the Postglacial or Recent Period.

POPULATION OF MEXICO.—The Annual of the Bureau of Statistics of the Republic of Mexico publishes the results of the last census of the Republic, recently completed. The total population is 12,144,562. The City of Mexico has 326,913 inhabitants; Guadalajara, 95,000; Puebla, 91,275; San Luis Potosi, 63,573; Guanajuato, 52,112; Leon, 47,739; Monterey, 42,529; Pachuca, 39,849; Zacatecas, 38,000. Fourteen other cities have over 20,000 inhabitants each, 38 over 10,000 and 118 over 5,000.

SOUTH AMERICA.

COUNT BAULX IN PATAGONIA.—Count Henry de la Baulx, who has been sent by the French Government to Patagonia and Tierra del Fuego for anthropological and ethnological researches, reached Carmen de Patagones on the Atlantic coast in March last and began his ascent of the Rio Negro. He will follow this river and its tributary, the Limay, to the Cordilleras, will then travel south to the head waters of the Rio Chubut, and will descend it to the sea, at Rawson. He expects to be gone on this journey until May or June of next year, and besides his studies among the natives he hopes to collect much material for the better mapping of the hydrology of southern Patagonia. An excellent outfit of instruments was supplied to him. After his return from this journey he will go to Buenos Ayres to outfit for his work in Tierra del Fuego.

ATTACK UPON DR. HERMANN MEYER IN BRAZIL.—Dr. Hermann Meyer, of Leipzig, who, with Dr. Ranke, of Munich, went to South America to study some of the still unknown tribes of Central Brazil, met with a reverse on the threshold of his work. Before starting for the far interior, however, he went inland from Laguna to the mountain range of the Serra Geral, where he met the almost unknown tribe of the Bugres Indians in the forest of the upper Tubarão River. They gave his party a most inhospitable reception, falling upon his camp one night with a shower of arrows, and compelling him to retreat, fortunately without any loss. The expedition returned to Laguna, and has since pushed into Matto Grosso, where Meyer expected chiefly to work, by way of the Paraná and Paraguay rivers (*Deutsche Rundschau*, 1896, No. 9).

BRAZIL STILL HOLDS TRINIDAD.—As the result of the strenuous protest of Brazil, Great Britain has relinquished her claim upon the small island of Trinidad, which she undertook to appropriate in 1895 as a cable station. Great Britain has acknowledged the sovereignty of Brazil over this island, which is in the Atlantic, a little over 600 geographical miles from the Brazilian coast, below 20 degrees south latitude.

STRUGGLE OF THE ONA INDIANS FOR FOOD.—The commission sent by the Chilian Government to report upon the condition and prospects of its possessions in Tierra del Fuego has reported that the main food resource of the nomadic Onas, who live in the northern half of the main island, is disappearing. In the Chilian territory the Onas subsisted almost wholly upon a small rodent, the

cururo, which breeds rapidly, and was found in large numbers on the plains. It does not thrive in wooded regions. These plains have been appropriated by the sheep farmers, and it is a peculiarity of the cururo that it disappears entirely from the districts where sheep are introduced. The result is that the Onas, deprived of their usual means of existence, have been hunting sheep instead of cururos. They like mutton even better than cururo flesh, and have quickly learned to value the sheep pelt; but the farmers and the natives have become enemies in consequence, and the government is engaged upon the problem of adjusting the grievances of both parties.

SHORTENING THE JOURNEY FROM BOGOTÁ TO THE UNITED STATES.—In order to reach Atlantic steamers bound for this country or Europe, the citizens of Bogotá, capital of Colombia, have been accustomed to go by rail southwest to Ibagué, then north by the Magdalena River steamers to Santa Maria near the Caribbean Sea, then east by coast steamers to Trinidad. All freight, also, has been forwarded or received by this very circuitous route. The Meta River, east of Bogotá and a tributary of the Orinoco, is nearer the capital than the Magdalena, and a Frenchman, Joseph Bonnet, living in Colombia, has long agitated in favor of utilizing the Meta as a more direct route to Trinidad, making use of the Macareo arm of the Orinoco delta which reaches the sea just south of the island. Mr. Bonnet built a small steamer in Trinidad of about four feet draught which, starting from Port of Spain, ascended the Orinoco and the Meta to Cabuyaro within about 110 miles of Bogotá. The two towns are to be connected by rail with the coöperation of the Colombian Government.—(*Globus*, Vol. LXX, No. 1.)

ASIA.

A RAILROAD FROM MERV TO KUSHK.—The Russian Government has decided to build a railroad from Merv to Kushk, a Russian military post only six miles from the Afghan border at Karatepe and ninety miles north of Herat. The line, passing through the Murghab and Kushk River valleys, will be 225 miles in length and is to be completed in two years. The road will be of military importance and will probably promote trade between Russia and Afghanistan to some extent. According to the understanding between Russia and Great Britain an extension of the line into Afghanistan would be regarded by the latter power as a breach of friendly relations.

A BRANCH OF THE TRANS-CASPIAN R.R.—Russia has decided to build a branch of the Trans-Caspian R.R. along the left bank of the Oxus, from Charjui where the railroad crosses the river into Bokhara, to Kerki, about 140 miles.

THE MEKONG RIVER—Lieutenant Simon, leader of the Hydrographic Commission of the Mekong, who achieved in August, last year, the almost acrobatic feat of forcing the little gun-boat *La Grandière* through sixty-eight rapids in that river between Vientian and Luang-Prabang, is unable to give a very encouraging view of the prospects of utilizing the river for commerce throughout the 1,200 miles between Luang-Prabang and the sea. At low water, navigation is impossible. At medium height, navigation in the cataract regions begins, but is very difficult. At high water (from 25 to 35 feet above mean level), Luang-Prabang may be reached without serious difficulty. About three months in the year the river may be navigated between Vientian and Luang-Prabang.—(*Revue Française*, May, 1896.)

A MAMMOTH SKELETON.—The finding of a mammoth skeleton near Tomsk gives additional proof that man was contemporaneous with this animal in northern Europe and Asia. The bones were found at a depth of about eight feet, some of them lying on a fireplace amid prehistoric stone implements. Three bones, believed to be human, were found with the other remains.—(*Globus*, Vol. LXX, No. 3.)

LAKES EXPLORED IN CELEBES.—The brothers Sarasin have crossed the southeast arm of Celebes and found the two large mountain lakes, Matanna and Towuti, hitherto known only by hearsay. The first is twelve geographical miles long by three wide and a sounding to a depth of 1,575 feet did not reach bottom. The remains of an ancient lake village were found on the south shore and pottery and bronze articles obtained from the natives are similar to relics of the European Lake Dwellers. Lake Matanna is about 1,300 and Towuti 1,150 feet above the level, about 35 miles long and quite wide at its northern end. They occupy an S-shaped valley between mountain ranges.—(*Verhandlungen* of the Berlin Geographical Society, 1896, p. 266.)

AFRICA.

ZONES OF ALTITUDE IN MID-AFRICA.—In his recent book "A Naturalist in Mid-Africa," Mr. G. F. Scott-Elliot distinguishes four zones of altitude in Central Africa: (1) the cocoanut or oil

palm zone, below 3,000 feet; (2) the coffee zone, from 3,000 to 5,000 feet; (3) the zone adapted for white colonization, 5,000 to 7,000 feet; (4) the cloud belt, about 7,000 feet. He gives the height of Mount Ruwenzori at 16,700 feet. The upper limit of forest on its slopes is 9,000 feet, of bamboos 11,000 feet, and of heather 15,500 feet, at which elevation snow begins.

MARINE TYPES IN LAKE TANGANYIKA.—Mr. R. T. Gunther discusses in the *Quarterly Journal of Microscopical Science* the occurrence of such marine forms as the jelly-fish in the fresh waters of Lake Tanganyika, where also several genera of molluscs are found of an unmistakably marine type. He suggests that these marine forms may have been introduced at a time when the lake region was many hundreds of feet lower than at present and the Atlantic extended over the Congo basin of to-day with a fiord-like arm occupying the present place of Tanganyika. This view that Tanganyika is an old arm of the sea is controverted by the Belgian geologist, M. Jules Cornet (*Le Mouvement Géographique*, 1896, Nos. 25-26), who believes that the present character of the shells is the result of adaptation to environment. So large a lake reproduces, in some respects, the conditions of life prevailing in the ocean as, for instance, in the results of severe storms which would shatter delicate shells. He points out also that the medusæ, a specimen of which from Tanganyika was described by Mr. Gunther, are found in other waters that have had no communication with the sea, as, for instance, at Bámako on the Upper Niger. The fact that no deposits showing traces of marine organism have been found in Central Africa he regards as strong evidence against the theory of the marine origin of the lake. He argues that the formation of the lake was due, more probably, to the earth movements which Prof. Suess shows opened the great East Africa rift of which the bed of Tanganyika forms a part.

THE FRENCH PROTECTORATE OF FUTA-DJALLON.—This large and fertile region of West Africa, within which some of the most important rivers of the Sudan, the Niger, Senegal, Scarcies and Tankisso take their rise, has never been effectively occupied by France, though Dr. Bayol and the Almamy signed the treaty declaring the protectorate in 1881. Since then France's other interests in the Sudan have diverted attention from Futa-Djallon. An administration has now been organized with M. de Beeckmanu at its head, supported by Captain Aumar and his tirailleurs. They were received at the capital, Timbo, on March 18 last, by Almamy Bokar-

Biro, who made proclamation of the protectorate and of his fealty to France.

THE SAND DUNES OF THE SAHARA.—For several years the French have been experimenting successfully at Aïn-Sefra with a view to fixing the sand dunes on the borders of the Sahara. M. Paul Privat-Deschanel says in the *Revue Scientifique* that a considerable number of plants were found to derive sufficient nourishment from the sand to keep them alive if protected at first so that they might establish themselves before the sand overwhelmed them or left their roots bare. The plan was hit upon of covering large areas with a litter of alfa grass, and in two years 120 acres were reclaimed. The plants that flourish best on the sand thus reclaimed are the Barbary fig, aspen and peach, which thrive better than the tamarisk or acacia, suggested by the Forestry Department.—(*The Geographical Journal*, 1896, September.)

BUSUMAKWE LAKE.—Two days' journey southeast of Kumassi, the capital of Ashanti, is Lake Busumakwe, which has long been indicated on the maps under the name Bosonotshe but which was first studied, last spring, by Major Donovan, who spent three days among the very numerous and hospitable people dwelling around its shores. He says the lake is about nine miles long, over six miles wide, and is surrounded by many villages of fishermen. A peculiar feature are the numerous dead tree-trunks standing erect in the lake.—(*Globus*, Vol. LXX, No. 1.)

THE HAUSA STATES.—One of the most important African books of this year is "Hausaland," by the Rev. Charles H. Robinson, who has devoted three years to the work of the Hausa Association, and has recently returned from the Hausa territories through which he travelled 1,500 miles. The Hausa Association was organized in Great Britain to study the Hausa language, which is spoken by 15,000,000 people, and the means of introducing Christianity and civilization into these states in the Central Sudan, covering an area of about 500,000 square miles. These states extend from the middle Niger River to Bornu west and east, and from the Sahara to the Benue River north and south. Mr. Robinson entered this region at Loko on the Benue, travelled north to Kano and then southwest to the Niger. Every ten or twelve miles, as a rule, he passed two or more villages of considerable size, and about every fifty miles came to a town containing from 10,000 to 30,000 people. Sokoto, the political capital, is peopled largely by Fulahs instead of Hausas.

Kano is by far the most important town, and its cloth, woven from native-grown cotton, is found all over North Africa from Alexandria to Lagos. More than 25,000 people attend its market daily, and traders from most parts of Africa, north of the Equator and west of the Nile, meet here. The Hausa native is perfectly black, but differs from the ordinary negro, his lips, for instance, being less thick and his hair less kinky. He is industrious, a natural trader, and also a fearless soldier. The governor of the Gold Coast says the only difficulty in battle is to restrain the Hausa soldiers. No part of the Hausa territory is 4,000 feet above the sea, and the region can probably never be colonized by the Caucasian race; but it is now within the British sphere in Africa, and Mr. Robinson says it can be governed and exploited with mutual advantage to Great Britain and the natives. The first great needs are a better monetary currency to supplant cowrie shells, about 100 pounds of which are worth only \$2.50; better transport facilities, which a railroad alone can supply; and the suppression of the slave trade and slave raiding, the great evil of the country, one Hausa chief often making war upon another to enslave persons of his own tribe and race.

EDUCATIONAL.

DETAILED TOPOGRAPHICAL MAPS IN GRAMMAR AND HIGH SCHOOLS.—Prof. Wm. M. Davis, Professor of Physical Geography in Harvard University, has written two pamphlets on the use of the State maps of Connecticut and Rhode Island, respectively, as an aid to the study of geography in grammar and high schools. The pamphlets have been published by the State Boards of Education of those States. Prof. Davis explains the meaning of the color scheme and contour lines; shows how the use of the map in schools may promote a clear perception of the fundamental facts of earth forces in their relation to Man, their influence upon human conditions and activities; shows how these facts of earth form may be learned by direct observation in the home district, and by the study of pictures, maps and verbal descriptions; gives suggestions for the use of the maps in the study of home geography; defines the geographical features to be observed in field study, such as mountains, uplands, ridges, hills, valleys, lowlands, drumlins, gravel hills, plains, terraces, flood plains, marshes and meadows, tidal marshes, forms of water and coast features; illustrates these forms by examples from these States and elsewhere; indicates the importance of leading the student to perceive the various influences these surface features have had upon settlement, occupations, etc.; suggests

a scheme for the distribution of the work through the school course and concludes with remarks on the preparation of the teacher. While these publications are specially designed for use in the schools of Connecticut and Rhode Island, they will be valuable aids in the teaching of geography generally. No teacher in our common schools can give careful study to one of them without having his views enlarged as to the real scope and usefulness to which the teaching of geography may attain in our educational system. If scholars, also, are taught how to handle and understand the excellent maps provided by our Geological Survey, it will go far towards creating a larger demand for a higher grade of cartographic products from map publishers in general.

GEOGRAPHICAL TEACHING IN GREAT BRITAIN.—The Geographical Association in Great Britain has issued a memorandum to the various Boards of School Examiners, with a view to promote a more scientific system of instruction. Examiners are urged to recommend courses of instruction in accordance with the ideas that “the main principles of Physical Geography should form the basis of geographical teaching at all stages,” and that in the secondary schools “a general knowledge of geography, based on physical principles, should be required, together with a special study of some selected region, *e. g.*, India, a group of British Colonies, South America, Central Europe.”

GEOGRAPHICAL METHODS.—Professor Ludwig Neumann has written a paper (*Geographische Zeitschrift*, 1896, No. 1) in which he surveys German literature on the methods of teaching Geography, presenting a compendium of valuable ideas which the reader could gather from the literature itself only by very large expenditure of time. He insists upon the importance of the teaching of geography by experts, and says it is most absurd to entrust the work of the class-room to a teacher who “has not had a book of geography in his hand for eight or ten years, and has no idea of its scope, methods or teaching material.”

GENERAL.

THE CORAL ISLAND EXPEDITION.—The formation of coral atolls and reefs is one of the great disputed problems and the controversy over it has been almost fierce at times, particularly since the accuracy of Mr. Darwin's famous theory has come to be strongly contested. The great difficulty is that while a geologist may wander over a mountain and solve the secret of its existence, he has not

been able to study sub-aqueous mountains in any satisfactory way. When Mr. Darwin wrote to Alexander Agassiz on May 5, 1881, concerning the divergent views of coral formation held by himself and Dr. John Murray, he said: "I wish that some doubly rich millionaire would take it into his head to have borings made in some of the Pacific and Indian atolls and bring home cores for slicing from a depth of 500 to 600 feet." The *London Times* says that this is exactly what is now being done, and that an expedition is at work on a coral atoll in the Pacific. The British Association, the Royal Society and the Government of New South Wales are co-operating in the matter. The leader of the expedition is Mr. W. J. Sollas, Professor of Geology and Mineralogy in the University of Dublin. The scene of work is in Funafuti, in the Ellice group, and the largest isle of the atoll of that name. It was selected as a typical atoll. It is about four miles long by a half-mile wide, and is nowhere higher than eight or nine feet. Thither the expedition, with the boring plant from Sydney, was conveyed by the British naval vessel *Penguin*. Prof. Sollas's instructions are simply "to investigate a coral reef by sounding and boring," and he is expected to carry to his work a mind wholly unbiased by the various rival theories of coral reef formation. The chief problem is to ascertain upon what substances coral reefs are formed, and though the coral polyp does not usually live at a greater depth than ninety feet and has never been found at a greater depth than 300 feet, Prof. Sollas will go down 1,000 feet if he can do so with the means at his command, and thus settle the question beyond all doubt. He expects not only to bore through the reef and into its foundations, but also to study the life history of the polyp and its interesting product.

THE BUDDHIST SACRED TREE.—The story of the sacred tree that grows in front of the temple in the Tibetan lamasery of Kumbum has been severely shaken by recent investigations. Father Huc told, in his charming book, of this tree whose leaves were miraculously inscribed with figures of Buddha, sacred formulæ or prayers. Later explorers, among whom were Potanine, Grenard and Szechenyi, saw the tree and attempted to explain the mysterious markings on its leaves and bark. M. Potanine thought some insect wrought the tracings. Another explanation was that the markings pertained naturally to the tree, which was very remarkable indeed, inasmuch as whole sentences in the Tibetan language might be read on the leaves. The one thing certain was that the priests sold the leaves at a very high price to the faithful. M. Edouard Blanc, the explorer, who has returned to France, saw the sacred tree while in

Tibet, and asserts that the holy inscriptions are an evident artifice of human hands, and that the imposition has been handed down from one generation to another of the lamas of Kumbum, who number about 2,000. Some of the leaves were submitted, last summer, to Mr. Thistleton-Dyer, of Kew Gardens, London. He says that the tree is an ordinary *syringa villosa*, common in China, and that the markings are impressed on the leaves by moulds, aided probably with heat.

MISCHIEVOUS EARTHQUAKE PROPHECY.—“Professor” Falb, of Vienna, inflicted grievous injury upon Athens in 1894 by predicting that the city would suffer severely from an earthquake on May 5. Nearly every one who could do so fled from the city, and there was indeed great suffering, caused, however, entirely by Falb, for there was no earthquake. *Globus* (Vol. LXX, No. 1) says that another of his mischievous prophecies threw Valparaiso, Chili, into a sad state of terror in March last. He predicted one of his “critical days” for March 29, and for several days preceding all the trains were crowded with fugitives bound for the mountains. The number of fugitives was about 7,000. There was no earthquake nor trouble of any sort except that caused by this irresponsible prophet.